<u>What is claimed is:</u>

1. A method of encoding digital data, the method comprising:

mapping a plurality of samples constituting the digital data onto bit planes; and

selectively encoding all of bit-sliced data of the bit planes from bit-sliced data composed of most significant bits mapped onto the bit planes to bit-sliced data composed of least significant bits in consideration of an encoding efficiency or according to a transformed bit-sliced encoding method.

2. The method of claim 1, further comprising packaging the encoded samples into a hierarchical structure.

3. The method of claim 1, wherein according to the transformed bit-sliced encoding method, a portion of bit-sliced data constituting a predetermined pit plane is lossless-encoded, and position information of a peak, the remaining bit plane information, and peak data are encoded as side information.

4. The method of claim 1, wherein the encoding comprises:

expressing the samples composed of sign data and magnitude data as binary data each having the same number of bits;

bit-slicing magnitude data constituting expressed digital data;

lossless-encoding bit-sliced data composed of most significant bits;

encoding sign data of a sample that first has a non-zero bit of the encoded bit-sliced data; and

performing the lossless-encoding and encoding from bit-sliced data composed of next significant bits to bit-sliced data composed of least significant bits.

5. The method of claim 4, wherein the encoding is performed according to Huffman-coding.

6. The method of claim 4, wherein the encoding is performed according to arithmetic-coding.

7.   The method of claim 2, wherein side information corresponding to a plurality of layers and a plurality of encoded quantization samples are packaged into a hierarchical structure.

8.   An apparatus for encoding digital data, the apparatus comprising:

a bit slicing unit that bit-slices a plurality of samples constituting the digital data to obtain bit-sliced data; and

an encoding unit that selectively encodes all of bit-sliced data of bit planes from bit-sliced data composed of most significant bits of the bit planes to bit-sliced data composed of least significant bits in consideration of an encoding efficiency or according to a transformed bit-sliced encoding method.

9.   The apparatus of claim 8, further comprising a bit packing unit that packages the samples encoded by the encoding unit into a hierarchical structure.

10.   The apparatus of claim 8, wherein the encoding unit lossless-endoces bit-sliced data of a portion of a predetermined bit plane according to the transformed bit-sliced encoding method, and position information of a peak, the remaining bit plane information, and peak data are encoded as side information.

11.   The apparatus of claim 8, wherein the bit slicing unit bit-slices magnitude data of samples that are composed of sign data and magnitude data and are expressed as binary data each having the same number of bits, and the encoding unit lossless-encodes bit-sliced data composed of most significant bits and sign data of a sample of the lossless-encoded bit-sliced data that first has a non-zero bit and then performs lossless-encoding to bit-sliced data composed of least significant bits in the same manner.

12.   The apparatus of claim 8, wherein the encoding unit Huffman-codes the bit-sliced data.

13.   The apparatus of claim 8, wherein the encoding unit arithmetic-codes the bit-sliced data.

14. The apparatus of claim 8, wherein the bit packing unit packages side information and a plurality of lossless-encoded quantization samples corresponding to a plurality of layers into a hierarchical structure.

15. A method of decoding digital data, the method comprising:

analyzing a bitstream to obtain at least one encoded bit-sliced data corresponding to a predetermined bit plane and side information encoded according to a transformed bit-sliced encoding method;

decoding bit-sliced data corresponding to the predetermined bit plane with reference to the bit-sliced data and the side information; and

bit-combining the decoded bit-sliced data to obtain samples constituting the digital data.

16. The method of claim 15, wherein the analyzing comprises decoding position information of a peak, the remaining bit plane information, and peak data as side information.

17. An apparatus for decoding digital data, the apparatus comprising:

a bitstream analyzing unit that analyzes a bitstream to obtain at least one encoded bit-sliced data corresponding to a predetermined bit plane and side information encoded according to a transformed bit-sliced encoding method;

a decoding unit that decodes bit-sliced data corresponding to the bit plane with reference to the bit-sliced data and the side information; and

a bit combining unit that bit-combines the decoded bit-sliced data to obtain samples constituting the digital data.

18. The apparatus of claim 17, wherein the bitstream analyzing unit obtains position information of a peak, the remaining bit plane information, and peak data as side information.